

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

- 1 Claim 1 (previously presented) Process for designing an
2 electronic system able to operate under X or gamma radiation
3 comprising the following stages:
- 4 I. Enumerating all the function to be implemented by the
5 system;
- 6 II. determining electronic components able to physically
7 implement these functions whilst giving preference to models
8 having the larger scale integration;
- 9 III. determining the volume of components which can be
10 protected by protection means referred to as shielding, whilst
11 taking account of a radiation dose to be withstood by the
12 system, the maximum permitted weight of the material chosen for
13 said shielding, as well as the distance at which components
14 selectively protected by said shielding could be from other,
15 unshielded components;
- 16 IV. establishing a list of the most vulnerable
17 components, whilst firstly taking account of their technology,
18 then their degree of integration, whilst associating with each
19 of these components the components which have to be installed
20 in their immediate vicinity, if existing, and whilst firstly
21 positioning the most vulnerable component, then that whose
22 vulnerability is slightly less high and so on, optionally
23 including identical vulnerability circuits;
- 24 V. selecting on the basis of the list of the preceding

25 stage, a group of components, commencing with the most
26 vulnerable components and limiting said group to components
27 which, by their very dimensions, can be installed in the volume
28 defined in stage III;

29 VI. examining whether the components in said system can
30 implement coherent functions and only communicate with the
31 remainder of the system by connection means which transmit
32 signals able to pass through without deterioration the distance
33 stipulated in stage III between the selectively protected
34 components and the other components; if all these conditions are
35 not simultaneously fulfilled, modifying by iteration the list
36 of components in order to obtain this result, but without
37 exceeding the volume defined in stage III; if all these con-
38 ditions are simultaneously fulfilled pass to the following
39 stage, the group of components obtained in this way being called
40 the "first group of first components" and the other components
41 being called the "second group of second components";

42 VII. designing the physical installation of the first
43 group of first components, designing the shielding, constituted
44 by at least one radiation-absorbing material, positioned around
45 said first group of components, and designing between the first
46 group of components and the second, connection means arranged
47 so as not to forma penetration path for ambient radiation;

48 VIII. designing the physical installation of the second
49 group of components, evaluating the radiation dose which they
50 have to withstand and, if necessary, using a complimentary
51 procedure for improving their suitability for operating under

52 irradiation by a technique other than shielding;

53 IX. evaluating whether the solution to the set problem is
54 in fact obtained; if it is not obtained, modifying the
55 parameters of stage III and repeating the process as from stage
56 III.

1 Claim 2 (original) Process according to claim 1,
2 comprising a subsequent stage:

3 X. validating the design by producing a prototype in
4 accordance with the preceding design stages, at least with
5 regards to the first group of components, installed and fitted
6 in its protection means, and performing irradiation tests; if
7 said tests are not in accordance with the specifications, the
8 parameters of stage III are modified and the procedure is
9 repeated as from stage III.

1 Claim 3 (currently amended) ~~Electronic system able to~~
2 ~~operate under X or gamma radiation~~ Application of the process
3 according to claim 1 to an electronic system comprising:

- 4 - a first group of first components incorporating
5 components which are vulnerable to said radiation, and
6 associated elements which have to be installed in their
7 immediate vicinity,
8 - a shield of metal in which is defined a volume
9 available for protection against said radiation, wherein said
10 first components are situated in said shield,
11 - a second group of second components, which may

12 withstand said radiation longer than the first and which are
13 not protected by shielding, and
14 - a flexible printed circuit for connecting the two
15 groups of electronic components, said flexible printed
16 circuit along a baffle provided at the input/output of the
17 shield to avoid forming a penetration path for said
18 radiation.

1 Claim 4 (original) System according to claim 3, wherein
2 the shield (22) is constituted by two half-shells (50, 51)
3 protecting said components (40, 41, 42, 43, 44, 45).

1 Claim 5 (previously presented) System according to claim
2 3, wherein the first group (21) of first components also
3 incorporates at least one microcontroller (40) located within
4 the shield (22).

1 Claim 6 (previously presented) System according to claim
2 3, wherein the first components located within the shield
3 (22) are connected to an interface card (20) by the flexible
4 printed circuit (23).

1 Claim 7 (previously presented) System according to
2 claim 3, wherein the first group (21) of first components
3 comprises a microcontroller (40) and an analog/digital
4 converter (43) located within the shield (22) and connected
5 to inter-faces, across the baffle in the shield, via flexible

6 integrated circuits carrying:
7 - a multiplexed bus (64) belonging to the microcontroller
8 (40),
9 - control and data signals (65) belonging to the converter
10 (43),
11 - the analog input signal (66) of the converter (43).

1 Claim 8 (original) System according to claim 3, wherein
2 the first group (21) of first components is mechanically
3 connected to the remainder of the system by a mechanical
4 suspension (96, 97, 98).

1 Claim 9 (original) System according to claim 8, wherein
2 said mechanical suspension is ensured by elastomer cores
3 (98).

1 Claim 10 (original) System according to any one of the
2 claims 3 to 9, wherein between the first group of first
3 components and the shield is incorporated an electrically
4 insulating, but thermally conductive product, in order to remove
5 via the shield the heat generated by the operation of the
6 electronic components.

1 Claim 11 (original) Application of the process according
2 to claim 1 to the electronic control of a mobile robot.